



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/507,061	08/03/2005	Gerold Lukowski	F-8379	8844
28107 7590 07/10/2008 JORDAN AND HAMBURG LLP 122 EAST 42ND STREET SUITE 4000 NEW YORK, NY 10168				
EXAMINER				
ARIANI, KADE				
ART UNIT		PAPER NUMBER		
1651				
MAIL DATE		DELIVERY MODE		
07/10/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/507,061

**Applicant(s)**

LUKOWSKI ET AL.

**Examiner**

KADE ARIANI

**Art Unit**

1651

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 and 21-50 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 and 21-50 is/are rejected.
- 7) ☒ Claim(s) 1-19, and 21-34, and 36-49 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/808)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

***DETAILED ACTION***

The preliminary amendment filed on April 11, 2008, has been received and entered.

Claim 20 is cancelled and claims 39-50 have been added.

Claims 1-19, and 21-50 are pending in this application and were examined on their merits.

***Oath/Declaration***

The declaration filed on 10/22/2007 has been received.

***Claim Objection***

The objections are withdrawn due to Applicants amendments filed on 04/11/2008.

However, claims 1-19, and 21-34, and 36-49 are objected to because of the following informalities:

In claims 1-10, 38-44, 48, and 49 the recitation "composition..." lacks the proper function word "A".

In claims 11-19, and 21-34, and 36-37, 45-47 the recitation "Method..." lacks the proper function word "The".

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

The rejection of claims 9, 10, 13, and 37 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, is withdrawn due to Applicant's amendments to the claims filed on 04/11/2008.

Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 16 recites the limitation "said active substances". There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The rejection of claims 16-37 under 35 U.S.C. 101 is withdrawn due to Applicants amendments to the claims filed on 04/11/2008.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-19, and 21-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Müller et al. (European Journal of Pharmaceutics and Biopharmaceutics, 2000, Vol. 50, p. 161-177) in view of Kreitlow et al. (Journal of biotechnology, 1999, Vol. 70, p. 61-163) and in view of Caudales et al. (International Journal of Systematic and Evolutionary Microbiology, 200,50 p.1029-1034) and further in view of Viseras et al. (International Journal of Pharmaceutics, 1999, Vol. 182, p.7-20) and further in view of Jacob et al. (Life sciences, Vol. 66, No. 25, p. 2433-2439) and further in view of Walker et al. (New Zealand Journal of Botany, 1997, Vol. 35, p. 396-384), and further in view of Chairungsrikerd et al. (European Journal of Pharmacology, 1996, Vol. 314, p. 351-356).

Claims 1-10, and 16-19, and 21-37 are drawn to a composition comprising agents, obtained by the conversion of biomasses of lipid-containing microalgae into

Art Unit: 1651

lipid-containing microparticles and/or nanoparticles, have a mean size 10 nm to 10  $\mu$ m, the composition further comprising one or more pharmaceutical or cosmetic active substances, radical scavengers, vitamins, wherein active substances comprise Xanthenes, norlichexanthone, further comprising one or more dispersion-stabilizing substances, wherein the lipid-containing microalgae comprise cyanobacteria from the class *Oscillatoriales*, microalgae are cultivated, a method of using the biomasses of lipid containing microalgae as carrier for active substances comprising adding active substances to said biomasses, and a method of using the composition comprising applying the composition to skin contaminated with MRSA, adding said composition to food.

Claims 11-15 are drawn to a method for the production of the composition according to claim 1 or 2, comprising converting biomasses of lipid-containing marine organisms by homogenization or emulsification into micro- and nanoparticles of with a diameter of 10 nm to 10  $\mu$ m (1000nm), said converting comprises heating the microalgae to liquefy fatty acids contained therein, optionally adding one or more active substances or additives, preparing a pre-suspension conducting high pressure homogenization, mixing with a surfactant-water mixture heated to a temperature above the fatty acids melting points and unification of the two phases, preparation of pre-suspension, and high pressure homogenization, heating of the microorganisms and the surfactant-water mixture is omitted, and active substances are adsorbed at room temperature or dispersed, spray drying or lyophilization.

Müller et al. teach a method comprising homogenization or emulsification of lipids into micro- and nanoparticles with a diameter of 10nm to 10  $\mu\text{m}$  (1000nm), heating the lipids until the liquefaction, optionally adding one or more active substances or additives, mixing the with a surfactant-water mixture heated to a temperature above the fatty acids melting points and unification of the two phases, preparation of pre-suspension, and high pressure homogenization in one or more homogenization cycles, heating of the lipids and the surfactant-water mixture is omitted (cold homogenization), and active substances are adsorbed at room temperature or dispersed, (p. 162, column 1, 3<sup>rd</sup> and 4<sup>th</sup> paragraphs and column 2, 1<sup>st</sup> and 2<sup>nd</sup> paragraphs, p. 163, column 1, lines 6-15, and last paragraph, p. 166, column 1, last 3 lines), subsequent spray drying or lyophilization (p. 171, column 2, part 9., lines 6-14), formation of an emulsion of water and lipids, dissolving the emulsion in an appropriate organic solvent, (p. 164, column 1, 2<sup>nd</sup> paragraph, lines 4-8).

Müller et al. further teach a composition comprising lipid nanoparticles (SNL) with a diameter of 10 nm to 10  $\mu\text{m}$  (p. 162, column 2, line 2), and the use of lipid nanoparticles as a carrier for drug delivery, vitamin, ubiquinones (Coenzyme Q10), radical scavenger, dietary supplements (p.164, Table 1.).

Moreover, Müller et al. teach the option to use lipids from food industry in solid lipid nanoparticles (SLN). Please note that the cultivation and use of microalgae in food industry were very well known in the art.

Müller et al. do not teach biomasses of lipid-containing microalgae to form lipid nanoparticles, adding clay mineral, adding xanthones derivatives. However, Kreitlow et

al. teach biomass of lipid-containing cyanobacteria strains (*Oscillatoriales*, *Chroococcales*, *Nostocales*), and antibacterial and antifungal activities of the lipophilic extracts obtained from cyanobacterial biomass. Kreitlow et al. further teach lipophilic extracts inhibited the growth of *S. aureus* (Abstract, p. 62, column 1, and column 2, 2<sup>nd</sup> paragraph, lines 15-17).

Further motivation to use lipid-containing microalgae biomass as a source of lipid in the method of Müller et al. is in Caudales et al. who teach the fatty acid composition of different strains of cyanobacteria, and the presence of high proportions of saturated straight chain and unsaturated straight chain fatty acids, mono- and poly-unsaturated fatty acids, and also fatty acids of different chain length (see Table 1.).

Müller et al. further teach the presence of mono- and diglycerides in the lipid used as matrix promotes drug solubilization, and the chemical nature of the lipid is important. More complex lipids being mixtures of mono-, di- and triglycerides and also containing fatty acids of different chain length form less perfect crystals with many imperfections offering space to accommodate the drugs. Chemically polydisperse lipids such as those used in cosmetics showed very good drug incorporation capacities (p.164 column 1, last 2 paragraphs, column 2, lines 1-9, and p.165 column 1, lines 1-2).

Moreover, at the time the invention was made phyllosilicates and fibrous clay were among the most widely used minerals in the composition of medicines and were being used as pharmaceutical excipients (Viseras et al. see Introduction, column 1, lines 1-14).

Chairungsilert et al. teach xanthone derivative, alpha-mangostin, and its anti-inflammatory properties (See Introduction and p.352, Figure 1.). Walker et al. teach biologically active compounds of lichens especially norlichexanthones (see Introduction and p. 347, column 2, end paragraph and p. 374, column 1), and Jacob et al. teach antifungal and antibacterial properties of thiocyanate.

Therefore a person of ordinary skill in the art would have been motivated to use the method as taught by Müller et al. to convert biomasses of lipid containing microalgae as taught by Kreitlow et al. and Caudales et al. in order to provide a method and a composition comprising agents obtained by the conversion of biomasses of lipid-containing microalgae into lipid-containing nanoparticles. Since at the time the invention was made the presence of high proportions of saturated straight chain and unsaturated straight chain fatty acids, mono- and poly-unsaturated fatty acids, and fatty acids of different chain length in cyanobacteria, was very well known, also it was well known that nanoparticles obtained from complex lipids offer more space to accommodate the drugs. Thus, the motivation would be the presence of mixtures of mono-, di- and triglycerides and fatty acids of different chain lengths and bioactive compounds in the microalgae biomass. Also as taught by Kreitlow et al. the antibacterial and antifungal activities of the lipids obtained from cyanobacterial biomass.

Moreover, a person of ordinary skill in the art would have been motivated to add active xanthone derivative and thiocyanate to the nanoparticles composition according to the above teachings with a reasonable expectation of success, because of their antifungal and antibacterial properties.

Applicant's arguments filed on 04/11/2008 have been fully considered but they are not persuasive.

Applicant argues that none of the references disclose or suggest the production of solid liquid nanoparticles from naturally present fatty acids from marine organisms' biomass, and that Kreitlow et al. fails to disclose or suggest and microparticles or nanoparticles of lipids from marine organisms.

Applicant argues that there is no indication in Muller et al. that the ingredients of biomass through the conversion into microparticles and nanoparticles would be better available and would provide surprising characteristics.

However, Muller et al. teach incorporation of active ingredients into solid SLN matrix protected them against chemical degradation and enhanced the stability, and that is cost-effective (p.171, 1st column 2<sup>nd</sup> paragraph).

Applicant argues that Muller et al. is directed to synthetic lipids and the disclosure of Kreitlow et al. fails to disclose or suggest any microparticles or nanoparticles of lipids from marine organisms, and one of ordinary skill in the art would not be prompted to combine the Muller et al. and Kreitlow et al.

However, as mentioned immediately above, Müller et al. teach the option to use lipids from food industry in solid lipid nanoparticles (SLN) preparation. Please note that at the time the invention was made the cultivation and use of microalgae in food industry were very well known in the art.

The claims would have been obvious because a person of ordinary skill in the art would have been motivated to combine the prior art to achieve the claimed method and composition and that there would have been a reasonable expectation of success.

### ***Conclusion***

No claims are allowed.

**THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kade Ariani whose telephone number is (571) 272-6083. The examiner can normally be reached on 9:00 am to 5:30 pm EST Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached on (571) 272-0926. The fax phone

Art Unit: 1651

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon B Lankford/  
Primary Examiner, Art Unit 1651

Kade Ariani  
Examiner  
Art Unit 1651